

### Stress Urinary Incontinence

There are multiple etiologies for urinary loss. Stress Urinary Incontinence (SUI) is the most common cause of urinary loss, particularly in women who have had children.

The causation of SUI is related to pregnancy and partuition-- most studies indicate pregnancy and childbirth are the leading causes of SUI. A 2004 study from New England Journal of Medicine showed women who were pregnant and had Cesarean Delivery were 1.6 times more likely than a woman who was never pregnant of developing SUI later in life<sup>1</sup>. Women who were pregnant and delivered vaginally were 3.7 times more likely than a woman who was never pregnant of developing SUI later in life, and 2.3 times more likely than women having Cesarean Section of developing SUI.

The NEW ENGLAND JOURNAL of MEDICINE

**Table 4. Odds Ratios for Incontinence According to Mode of Delivery.**

Comparison	Any Incontinence	Moderate or Severe Incontinence	Stress Incontinence	Urge Incontinence	Mixed-Type Incontinence
<i>odds ratio (95 percent confidence interval)</i>					
<b>Cesarean sections as compared with no deliveries</b>					
Univariable analysis	1.7 (1.3–2.1)	1.6 (1.1–2.3)	1.6 (1.1–2.2)	1.5 (0.9–2.8)	1.9 (1.3–2.8)
Age-adjusted analysis	1.5 (1.2–1.9)	1.4 (1.0–2.1)	1.4 (1.0–2.0)	1.4 (0.8–2.6)	1.7 (1.2–2.5)
<b>Vaginal deliveries as compared with no deliveries</b>					
Univariable analysis	2.8 (2.5–3.2)	3.3 (2.7–4.0)	3.7 (3.1–4.4)	1.4 (1.0–1.9)	2.6 (2.1–3.2)
Age-adjusted analysis	2.3 (2.0–2.6)	2.6 (2.1–3.1)	3.0 (2.5–3.5)	1.2 (0.9–1.6)	2.1 (1.7–2.6)
<b>Vaginal deliveries as compared with cesarean sections</b>					
Univariable analysis	1.7 (1.4–2.1)	2.1 (1.5–2.9)	2.3 (1.7–3.1)	0.9 (0.5–1.5)	1.4 (1.0–1.9)
Multivariable analysis*	1.7 (1.3–2.1)	2.2 (1.5–3.1)	2.4 (1.7–3.2)	0.9 (0.5–1.6)	1.3 (0.9–1.9)

\* Analysis was adjusted for age, parity, years since last delivery, and body-mass index.

A 2011 study<sup>2</sup> showed the hazard ratio for having surgery for pelvic organ prolapsed (POP). The hazard ratio for subsequently requiring surgery compared to women only having Cesarean Delivery was 2.1 after first vaginal delivery and 4.5 after three or more vaginal deliveries. Peak incidence of surgery was three decades after the deliveries. Another study by Handa and colleagues<sup>3</sup> followed women twenty five years after birth and assessed outcomes. They found women who had a non-instrumental, vaginal birth were three times more likely to have SUI and POP than women who had C – Section prior to onset of labor and a five times elevated risk for POP alone. Women with instrumental vaginal birth were four times more likely to have SUI and POP and eight times more likely to have only POP than women who had C – Section prior to onset of labor.

Various treatment options exist for stress urinary incontinence. A trial of conservative management is warranted in most women with SUI because of the low risk profile, prior to progressing to surgery. Women who have not yet completed childbearing should also pursue non-surgical interventions<sup>4</sup>. Kegel exercises are one management alternative which may be combined with biofeedback, electronic stimulation or use of incontinence pessaries. Pharmacologic treatment with duloxetine (Cymbalta) has been investigated, but its efficacy is very modest and as a therapy for major depression, anxiety and fibromyalgia has other non-urologic effects which may prove troublesome for many women.

### **Evolution of Surgical Therapy**

The Surgical treatment of urinary stress incontinence has changed over the last forty years. Standard of care procedure 35 to 40 years ago was Marshall-Marchetti-Krantz operation. In this surgery the endopelvic fascia next to the bladder neck is attached to the periosteum of the posterior pubic symphysis. Infection of the bone could ensue and tearing of the suture material occurred with this method. Another open variant, the Burch procedure was also popular. The Burch procedure involved plication of the the endopelvic fascia adjacent to the mid and proximal urethra at the bladder neck to the pectineal (Cooper's) ligaments on the posterior surface of the superior pubic ramus changing the angle between the urethra and the bladder.

By the early 1990's the standard of care changed with the evolution of laparoscopic or minimally invasive surgery. The new standard procedure became a laparoscopic Burch retropublic urethropexy. Various studies compared the efficacy of the Open Burch (OB) vs. Laparoscopic Burch (LB) procedures<sup>5</sup>. Short-term subjective cure rates at an 18-month follow-up were similar: 78 vs. 83 %. There were fewer peri-operative complications in LB compared to OB: 15 vs. 18 %. LB had a demonstrably shorter hospital stay and more rapid return to normal functioning. The laparoscopic variant offered clear advantages.

The standard of care has continued to evolve. In the last fifteen years tension free vaginal tape (TVT), and Trans-Obturator Tape (TOT) procedures were developed. Over a decade of experience with TVT is available. TVT offers a minimally invasive approach, is highly efficacious and has a very low incidence of adverse events associated with its use. The most common untoward event associated with TVT is bladder perforation because trocars are passed in the retropublic space blindly.

An updated procedure involves passing tape in a hammock-like configuration through the obturator foramen to elevate the midurethra—the Transobturator Tape procedure (TOT). Based on the anatomy of its placement, TOT is far less likely to injure the bladder in its placement. It also does not require any abdominal incisions.

Based on current perspective, older surgeries including Anterior Repair, Para-Vaginal Repair, Trans-Vaginal Needle Suspensions and Marshall-Marchetti-Kranz are rarely ever performed or indicated.

### **Contemporary Management**

It is well recognized that Midurethral slings are as effective as other surgical treatments for SUI, but with a shorter operative duration and a lower risk of certain postoperative complications.

This was demonstrated in a meta-analysis of 62 randomized trials<sup>6</sup>. Regarding short-term effectiveness (within 12 months postoperatively), the subjective cure rate of SUI among women who underwent placement of midurethral slings was comparable to other procedures:

- Midurethral sling versus bladder neck sling (BNS)
- Midurethral sling versus open retropubic colposuspension (ORC)
- Midurethral sling versus laparoscopic colposuspension (LC)

Compared to mid-urethral sling, hospital stay was longer for BNS (0.5 days), ORC (four days), and LC (one day). Urgency or urge incontinence was significantly less frequent with midurethral slings than BNS (6 vs. 17%) bladder neck slings and laparoscopic colposuspension (4 vs. 13 %). Difference was insignificant compared when midurethral sling as compared with ORC (9 vs. 12 %). Finally, complications between the procedures were similar except with respect to incidence of bladder perforation; perforation occurred more frequently during midurethral sling surgery compared with ORC (4.7 vs. 1.1 %) and LC (4.9 vs. 1.7 %).

Data from recent studies<sup>7-8</sup>, suggests similar efficacy in treatment of genuine SUI with TOT vs. TVT. Barber, et al, published an equivalence trial involving 170 patients. One year after surgery 79% of patients with TVT and 82% of patients with TOT were either “much better” or “very much better.”

	TVT	TOT	P
Stress incontinence symptoms*			
Any	12/83 (15)	11/73 (15)	.91
Bothersome <sup>†</sup>	11/83 (13)	9/73 (12)	.86
Urge incontinence symptoms <sup>‡</sup>			
Any	29/81 (36)	23/72 (32)	.61
Bothersome <sup>†</sup>	27/81 (33)	21/72 (29)	.58
Anticholinergic use postoperatively	16/84 (20)	10/74 (12)	.34
Bladder diary			
Incontinence episodes/d	0 (0–16)	0 (0–7)	.18
Pads/d	0 (0–5)	0 (0–6)	.43
No incontinence episodes on diary	46/70 (66)	44/64 (69)	.71
Patient global impression of improvement			.88
Very much better	45/82 (56)	38/75 (51)	
Much better	18/82 (23)	23/75 (31)	
Somewhat better	6/82 (7)	5/75 (7)	
No different	7/82 (9)	5/75 (7)	
Somewhat worse	4/82 (5)	3/75 (4)	
Much worse	2/82 (2)	1/75 (1)	

TVT, tension-free vaginal tape; TOT, transobturator tape.  
Data are expressed as n/N (%) or median (range).

As expected bladder perforation was 7% in the TVT group and 0% in the TOT group. These surgeries are less invasive, easier to perform, require less surgical time and do not require post-operative hospitalization.

DWC ordinarily does not cosmetically correct anterior vaginal prolapsed unless mucosa protrudes beyond the labia majus. When required, Anterior vaginal repair with Anterior Colporrhaphy is far less successful in treatment of Stress Urinary Incontinence than repair with Type 1 polypropylene mesh<sup>9</sup>. Mesh erosion in this study occurred in 14% of cases.

**Complications**

The most significant complications of midurethral sling, bladder perforation and urethral injury, are far less likely when the Trans-Obturator route is employed. Cystoscopy is performed at the conclusion of the procedure to assure injury has not occurred. If injury is observed it is treated immediately.

The potential for mesh erosion and the preoperative care involving local vaginal administration of estrogen is described. Post-operative vaginal discharge, vaginal discomfort, bleeding or partner stating "something is felt" in the vaginal wall are all signs of mesh erosion. Vaginal mesh erosion occurs in about 5 - 8% of patients using polypropylene graft material. Erosion of mesh into urethra or bladder are less common consequences that require additional attention and, possibly, re-operation.

Management of post-operative mesh erosion include application of local estrogen cream or local, in-office, excision of the protuberant mesh. Rarely, return to the Operating Room and a subsequent general anesthetic are required for correction of mesh erosion.

**Choice of Procedures**

Midurethral sling is currently the procedure of choice for most women with Stress Urinary Incontinence. There are some surgeons who will perform a Burch retropubic urethropexy when laparoscopy or robotic assisted laparoscopy is already being used for hysterectomy or sacrocolpopexy. Other experts disagree and perform a midurethral sling along with laparoscopy. As pointed out above, effectiveness of both procedures is similar.

Some investigators have questioned whether women with SUI and urethral mobility should have a different surgical procedure than those with relatively fixed urethras (higher probability of Intrinsic Sphincteric Dysfunction). Observational studies have found high success rates in women without urethral mobility with midurethral slings (approximately 70 to 80 percent<sup>10-12</sup>). These success rates are similar to those from patients with urethral mobility. DWC does not change procedure based on absence of urethral mobility. Patients with immobile urethra and less than complete response to midurethral sling are offered peri-urethral bulking agents.

**Mixed Disorder**

Women with both Stress Urinary Incontinence and Over Active Bladder (OAB) can also be treated with Midurethral sling procedure. A recent study looked at the outcome of almost one hundred women with urodynamic Mixed Urinary Incontinence, with predominant SUI component treated with Trans-Obturator Tape procedure<sup>13</sup>. Seventy-five percent of women reported significant improvement in their Mixed symptoms at a one year follow-up. This result was achieved without independent treatment of the OAB component of the symptom complex.

Patients are recommended to go to the DWC Website for additional information. Lay-accessible sites such as UpToDate and WebMD provide valuable information as well.

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